

WHAT IS CLAIMED IS:

1. A bone-powder-impregnated, porous structure comprising a porous matrix made of a biocompatible material impregnated with fine bone powder.
2. The bone-powder-impregnated, porous structure according to claim 1,  
5 wherein it has fine communicating pores having an average diameter of 0.005-50  $\mu\text{m}$  in its entire body, said fine communicating pores being open on an outer surface of said porous structure at a density of 1 or more per an area of 50  $\mu\text{m}$  x 50  $\mu\text{m}$ .
3. The bone-powder-impregnated, porous structure according to claim 1,  
10 wherein it has communicating macro-pores having an average diameter of 100-1000  $\mu\text{m}$  in its entire body, which are open on an outer surface of said porous structure at a density of 1 or more per an area of 1000  $\mu\text{m}$  x 1000  $\mu\text{m}$ , and fine communicating pores having an average diameter of 0.005-50  $\mu\text{m}$ , which are open on inner walls of said communicating macro-pores at a  
15 density of 1 or more per an area of 50  $\mu\text{m}$  x 50  $\mu\text{m}$ .
4. The bone-powder-impregnated, porous structure according to claim 1,  
wherein it has communicating macro-pores having an average diameter of 100-1000  $\mu\text{m}$  in its entire body, which are open on an outer surface of said porous structure at a density of 1 or more per an area of 1000  $\mu\text{m}$  x 1000  $\mu\text{m}$ ,  
20 and fine recesses having an average diameter of 0.005-50  $\mu\text{m}$  and an average depth of 0.005-50  $\mu\text{m}$ , which are open on inner walls of said communicating macro-pores at a density of 1 or more per an area of 50  $\mu\text{m}$  x 50  $\mu\text{m}$ .
5. The bone-powder-impregnated, porous structure according to any one of claims 1-4, wherein said biocompatible material is at least one selected  
25 from the group consisting of ceramics, metals, and polymers.
6. The bone-powder-impregnated, porous structure according to claim 5, wherein said ceramics are calcium phosphate ceramics.
7. The bone-powder-impregnated, porous structure according to any one

of claims 1-6, wherein said fine bone powder is obtained by pulverizing living bone.

8. The bone-powder-impregnated, porous structure according to any one of claims 1-6, wherein said fine bone powder is demineralized bone powder.

5 9. The bone-powder-impregnated, porous structure according to any one of claims 1-8, wherein said fine bone powder has an average diameter of 50  $\mu\text{m}$  or less.

10. The bone-powder-impregnated, porous structure according to any one of claims 1-9, wherein the entire structure is porous.

10 11. The bone-powder-impregnated, porous structure according to any one of claims 1-9, wherein only a surface layer of said structure is porous.

12. A method for producing the bone-powder-impregnated, porous structure recited in any one of claims 1-11, comprising the steps of preparing said fine bone powder, and impregnating said porous structure with said fine  
15 bone powder.

13. The method for producing a bone-powder-impregnated, porous structure according to claim 12, wherein said porous structure is impregnated with fine bone powder in the form of a suspension.

14. An artificial bone comprising the bone-powder-impregnated, porous  
20 structure recited in claim 10.

15. An artificial bone comprising the bone-powder-impregnated, porous structure recited in claim 11.

16. An artificial dental root comprising the bone-powder-impregnated, porous structure recited in claim 11

25 17. A bone-powder-impregnated, surface-roughened structure comprising a surface-roughened matrix made of a biocompatible material, which is impregnated with fine bone powder.

18. The bone-powder-impregnated, surface-roughened structure according

to claim 17, wherein said surface-roughened structure has fine recesses having an average diameter of 0.005-50  $\mu\text{m}$  and an average depth of 0.005-50  $\mu\text{m}$ , which are open on its entire outer surface at a density of 1 or more per an area of 50  $\mu\text{m}$  x 50  $\mu\text{m}$ .

5 19. The bone-powder-impregnated, surface-roughened structure according to claim 17 or 18, wherein said biocompatible material is at least one selected from the group consisting of ceramics, metals, and polymers.

20. The bone-powder-impregnated, surface-roughened structure according to any one of claims 17-19, wherein said fine bone powder is obtained by  
10 pulverizing living bone.

21. The bone-powder-impregnated, surface-roughened structure according to any one of claims 17-19, wherein said fine bone powder is demineralized bone powder.

22. The bone-powder-impregnated, surface-roughened structure according to any one of claims 17-21, wherein said fine bone powder has an average  
15 diameter of 50  $\mu\text{m}$  or less.

23. A method for producing the bone-powder-impregnated, surface-roughened structure recited in any one of claims 17-22, comprising the steps of preparing said fine bone powder, and impregnating said  
20 surface-roughened structure with said fine bone powder.

24. The method for producing a bone-powder-impregnated, surface-roughened structure according to claim 23, wherein a rough surface of said surface-roughened structure is impregnated with fine bone powder in the form of a suspension.

25 25. An artificial bone comprising the bone-powder-impregnated, surface-roughened structure recited in any one of claims 17-22.

26. An artificial dental root comprising the bone-powder-impregnated, surface-roughened structure recited in any one of claims 17-22.